July 13, 1943. C. E. MOSS 2,324,104

RIVETING TOOL

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Fig. 1

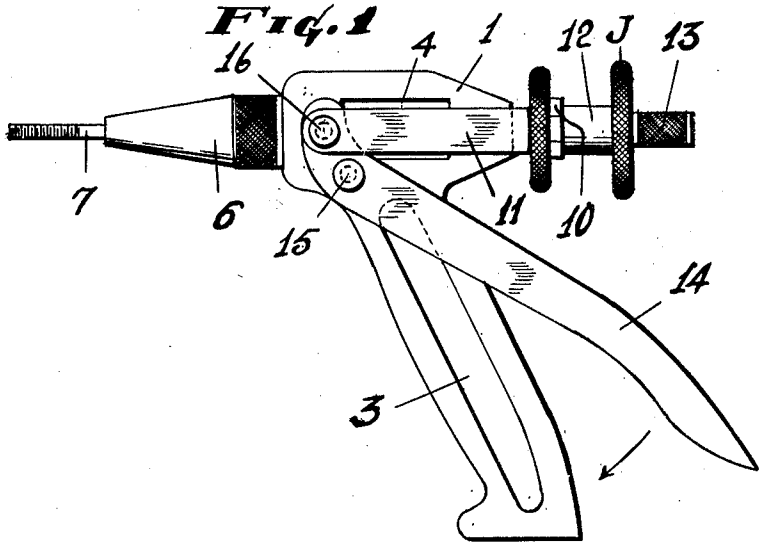


Fig. 2

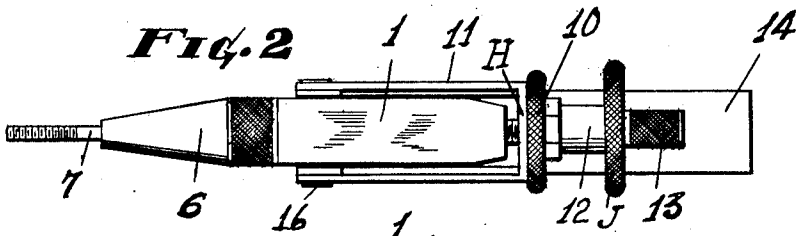


Fig. 3

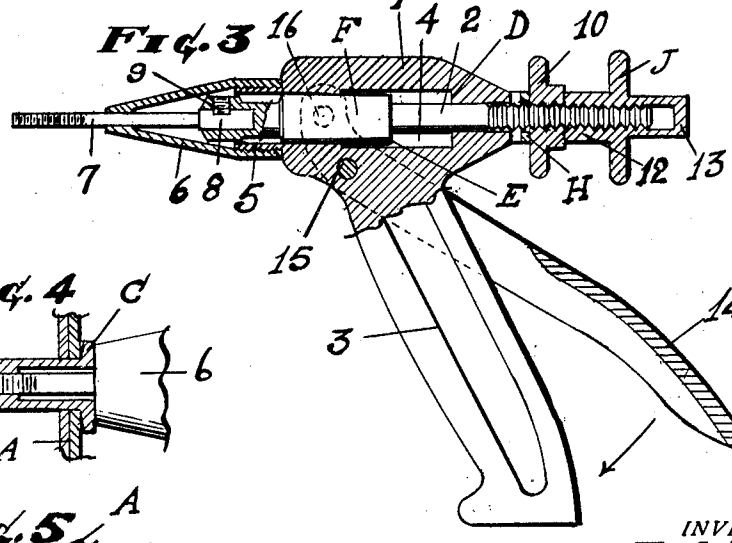
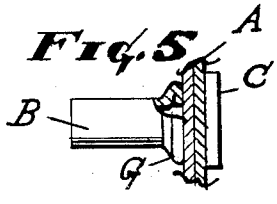


Fig. 4

Fig. 5



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Fig. 6

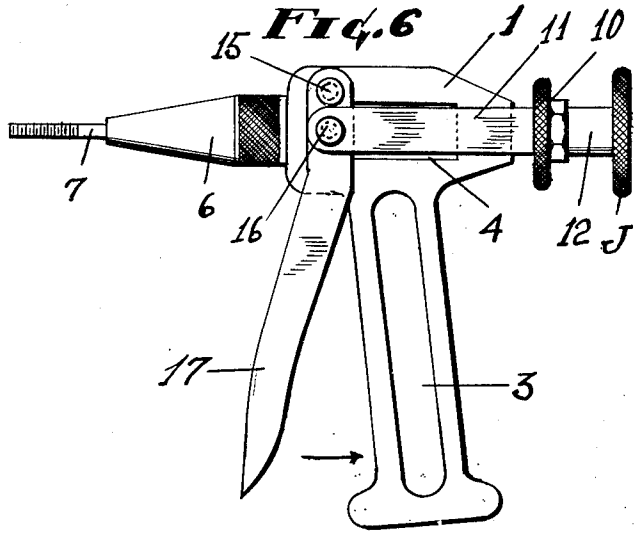


Fig. 7

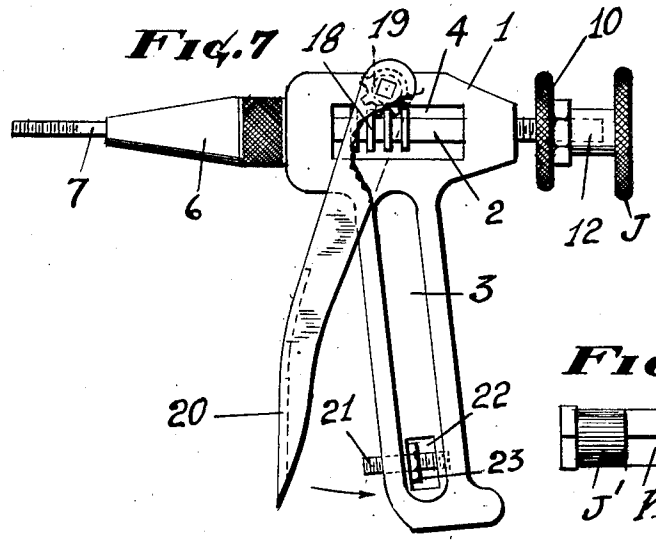


Fig. 8

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Patented July 13, 1943

2,324,104

UNITED STATES PATENT OFFICE

2,324,104

RIVETING TOOL

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Application September 15, 1941, Serial No. 410,896

2 Claims. (Cl. 218—19)

This invention relates to a riveting tool, and has for its principal object the arrangement of a tool to collapse rivets by lever action to avoid twisting movement of the tool in its function.

Another object is to provide a simple and efficient means to insert a rivet through apertured metallic sheets and collapse the rivet to snugly bind the the same together liquid tight, and the said tool being manually operated by a grip of the hand to actuate the collapsing elements of the tool.

A further object of this invention is to provide an adjustable automatic stop for the rivet collapsing lever to avoid mutilation of the rivet at the instant of the maximum strain required for snug engagement of the parts being secured together by the rivets.

A still further object of this invention is to provide a riveting tool that is inexpensive to construct, efficient in its performance, and adaptable for congested places.

These and other objects will hereinafter be more fully explained, reference being had to the accompanying drawings, forming part of this specification, and in which like characters will apply to like parts in the different views.

Referring to the drawings:

Fig. 1 is a side elevation of the riveting tool.

Fig. 2 is a top view of Fig. 1.

Fig. 3 is a side elevation of the tool, with parts removed for convenience of illustration.

Fig. 4 is an enlarged sectional view of the rivet prior to collapse thereof to bind sheets of metal together, and

Fig. 5 illustrates the result of collapsing the rivet.

Fig. 6 is a side view of a modified form of the tool with respect to the lever and yoke hook-up.

Fig. 7 is a side view of the tool modified with respect to a longitudinal thrust for the plunger, parts being removed for convenience of illustration.

Fig. 8 is an elevation of the pivot connection of the lever to the body of the tool, and also shows the carrying means for a gear to move the plunger when the lever is rocked, the gear being omitted.

The invention herein disclosed and later described in detail relates to a tool for the insertion and fastening of a rivet structure to bind firmly together sheets of metal A, or the like, when the rivet is collapsed by the tool. The rivet structure consists of a hollow pin B, one end of which is closed, the other end being open and having an annular flange C outwardly extending and surrounding the opening to function as a head for the rivet, said pin portion being threaded internally a major portion of its length inward from the closed end, the other portion being smooth and of a greater diameter than the threaded portion to receive a stem, the outer portion of the stem being threaded to engage with the internal threads of the pin to carry and insert the same through the apertured elements above referred to.

The structure of this invention consists of an elongated body portion 1 axially bored through each end to receive a plunger 2 slidable therein longitudinally of the body for the purpose later described, and the said body having a handle 3 obliquely extending from one side thereof and being integral therewith. The bore from the forward end of the body is greater in diameter as at 4 for a spaced distance inward, whereby an annular shoulder D is formed, said shoulder to function as a stop against which a shoulder E will engage to retain the plunger against outward movement rearward of the tool when the tool is free from engagement with the rivet, said shoulder E being at the rear end of an enlarged portion F of the plunger that slideably engages in a bore at the forward end of the head.

Integrally joined to and outwardly extending from the forward end of the head is a threaded nipple 5 that is adapted to engage with the threaded end of a conical cap 6 that is bored at its small end to axially align with the plunger and adapted to receive a pulling stem 7 slidable longitudinally in the bore, the stem having an enlarged shank 8 insertible in the forward end of the plunger, said plunger being bored to receive the shank snugly seating therein, and being secured by a set screw 9 threadedly engaging through the wall of the plunger, the inner end of the screw seating in a depression formed in the shank, whereby the pulling stem is retained and carried by the plunger in its reciprocating movement longitudinally. The outer or forward end of the stem is threaded in length sufficient to engage with the threaded portion of the rivet above described; when so engaged the flange of the rivet may seat snugly against the small end of the cap when moved theretoward by the stem.

It will be seen in Fig. 4 that the flange of the rivet is brought to snug engagement with the small end of the conical cap when the plunger is moved rearward to collapse the rivet as at G as shown in Fig. 5, in which figure is also illustrated the position of the sheets that are apertured, and through which the pin of the rivet

extends, and by drawing the pin portion of the rivet toward the flange the wall of said pin adjacent the sheets will collapse, extending outward to form a head coacting with the flange to bind the sheets firmly together by movement of the stem.

It will also be seen that the rear end of the plunger that outwardly extends from the body is threaded to receive a knurled wheel nut 10 threadedly engaging thereon, said nut to function as a shoulder against which the crotch H of a legged yoke 11 will engage, the crotch of the yoke being apertured to loosely engage on the plunger, the threaded engagement of the nut being means to adjust for proper longitudinal movement of the plunger and stem carried thereby. When properly adjusted, said nut is secured by a knurled wheel lock nut that threadedly engages on the threaded portion of the plunger, the wheel J of the nut having hubs 12 and 13 axially aligned and outwardly extending from each side thereof. Hub 12 serves to engage with the hub of the first said nut as locking means for both said nuts against rotation on the plunger. It will be seen that the bore of hub 13 is closed at its outer end as a protection against contact of an operator with the threaded end of the plunger, and the periphery of said hub being knurled is means to easily spin the stem to and from engagement with the rivet.

As a means to actuate the plunger, there is provided a bifurcated lever 14, the legs of which straddle the body and have a portion to serve as a handle adjacent thereto, the legs of the bifurcation being pivotally connected to the body by a headed pin 15 a spaced distance inward from the outer ends of the legs, and likewise the outer ends of the legs being pivotally connected by headed pins 16 to their respective free ends of the yoke legs. The parts being so arranged will provide a mechanical advantage to force said plunger rearward when the lever is rocked toward the handle as indicated by the arrow, the movement of which is to draw the rivet's stem toward the small end of the cap so that by movement of the lever the wall of the pin will collapse outward as shown in Fig. 5.

To provide for a predetermined tension of the rivet on sheets when the pin of a rivet has been collapsed, the tool is set so that in operation there will be an initial lost motion of the lever 14 and so that at the end of the stroke of plunger 2 the lever 14 will engage on the handle 3 to avoid a further strain on the rivet. This adjustment is accomplished by first threading stem 7 fully into the rivet, then screwing nut 10 into contact with yoke 11 and thereafter collapsing a rivet of a particular dimension to a desired extent without lever 14 as yet contacting handle 3. Thereafter nut 10 is rotated on the plunger to move the nut away from yoke 11, thus permitting the yoke H to follow said nut without moving said plunger. Lever 14 will follow movement of yoke H until said lever has contacted the handle 3. The tool will thus be adjusted to set a series of rivets of these particular dimensions in sheets of the size used in this adjustment, the strain on the rivet being its maximum when lever 14 strikes handle 3. In setting the second and succeeding such rivets lever 14 will initially move yoke H a distance equal to the distance nut 10 was moved away from yoke 11 during the last stage of the foregoing adjustment before yoke H contacts nuts 10, after which time nut 10 will be forced rearwardly and the plunger 2 will be moved rearwardly by nut 10 until lever 14 strikes handle 3 to collapse the rivet.

To remove the tool from a rivet after securing the same, the lever is released from tension with the plunger, at which time the plunger may be turned by turning the knurled wheels as a unit to loosen the stem in the rivet and then may be removed quickly by gripping the hub 13 with the finger to spin the plunger, and so on through a course of riveting.

The said riveting tool may be modified as shown in Fig. 6, in which case, the lever 17 is oppositely positioned for its working relation to the handle, and the pivot connection of the yoke and lever are likewise reversed to move the yoke in the same direction, whereby an equal efficiency is maintained for the function of the tool, as the mechanical advantage is the same as heretofore described, and furthermore the hub of the outer nut has been omitted as a matter of economy; otherwise the tool is practically the same in construction with respect to its adjustment and operation heretofore described.

A further modification for the tool is illustrated in Figs. 7 and 8, in which instance the plunger has a plurality of extending annular ribs 18 spaced apart, integral therewith and adapted to engage the teeth of a gear 19 that is trunnioned in the body portion through the medium of a shaft as illustrated in Fig. 8, said shaft comprising two cylindrical portions J' and J'' spaced apart and adapted to seat in suitable bearings formed in the sides of the body. Between said cylindrical portions is positioned a rectangular portion K on which is mounted the said gear, the outer ends of the shaft each having a rectangular extension to rigidly engage a lever 20, the lever being bifurcated to straddle the body of the tool, the outer ends of the legs to engage on the rectangular portions of the shaft respectively, by which means rocking movement of the lever reciprocatingly will move the plunger for the purpose heretofore described.

The annular ribs surrounding the plunger are means to permit turning of the plunger without moving the same longitudinally. Positioned adjacent the outer end of the handle is a threaded stud 21 to engage in a threaded aperture positioned in the handle transversely and entering the forward side of the handle, there being an opening 22 through which the stud extends, and in said opening is positioned a lock nut 23 to threadedly engage the stud as securing means for the stud extending outward toward the lever to function as a gauge for the inward movement of the lever to collapse the rivet to engagement at a predetermined tension.

Other modifications may be made as lie within the scope of the appended claims.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. A riveting tool of the class described, the tool comprising the combination of a body portion axially bored and a handle integrally joined to the body and laterally extending therefrom, a lever pivotally connected to the body and adapted to rock toward and from the handle, a plunger engaging in the bore and adapted to revolve and move longitudinally therein, the plunger being threaded from one end a spaced distance therealong, said threaded portion partially extending outward from its respective end of the body, a pair of wheel nuts threadedly engaging on said threaded portion of the plunger

and adapted to contact each other as locking means for locking the nuts to the stem selectively therealong, one of said nuts as locked being adjacent the end of the body, the other nut having a hub extending from its outer end as spinning means for the plunger. the other end of the plunger being bored axially and extending outward from its respective end of the body as accessible means thereto, a threaded stem having a shank, said shank engaging in the bore of the plunger and means to secure the shank therein, a hollow conical cap and means to secure the large end thereof to the last said end of the body and being in axial alignment with the plunger with the stem thereof extending through the small end of the conical cap for threadedly receiving a rivet, and means actuated by the lever to move the plunger longitudinally, said means being a yoke comprised of a pair of legs to straddle the body and pivotally connected to the lever, the crotch of the yoke being apertured to slidably engage on the threaded end portion of the plunger to contact the first said nut to move the plunger when the lever is moved toward the handle.

2. A riveting tool of the class described, the tool comprising the combination of a body portion axially bored, one portion of the length of the bore being greater in diameter than that of the other length whereby a shoulder is formed, and a handle integrally joined to the body and laterally extending therefrom, a lever pivotally connected to the body and adapted to rock toward and from the handle, a plunger slidably and rotatably engaging in the bore of the body, said plunger varying in diameter to coincide with the bore of the body to form a shoulder on the plunger as a stop against outward movement of the plunger in one direction, the plunger being threaded from one end a spaced distance therealong, said threaded portion partially extending outward from its respective end of the body, a pair of wheel nuts threadedly engaging on the threaded portion of said plunger and adapted to contact each other as locking means for locking the nuts to the stem selectively therealong, one of said nuts as locked being positioned from the end of the body, the other nut having a hub extending from its outer end as spinning means for the plunger, the other end of the plunger being bored axially and extending outward from its respective end of the body, a threaded stem having a shank, said shank engaging in the bore of the plunger and means to secure the shank therein, a hollow conical cap, the large end of which is removably connected to the last said end of the body as accessible means to said shank securing means, said cap being axial with the plunger and the stem extending through and outward from the small end of the cap for threadedly receiving a rivet, and a yoke actuated by the lever to move the plunger longitudinally, said yoke being comprised of a pair of legs to straddle the body and pivotally connected to the lever, the crotch of the yoke being apertured to slidably engage on the threaded end portion of the plunger to contact the first said nut to move the plunger when the lever is moved toward the handle.

CLARENCE E. MOSS.